

# PRESENCE AND INTERACTION IN AN INQUIRY-BASED LEARNING ENVIRONMENT

David S. Stein and Constance E. Wanstreet

## Abstract

This mixed-methods study examined how interactions facilitated cognitive, social, and teaching presence in inquiry-based learning in a course where learners had the option to choose whether to conduct group work online or in person. Findings suggest that the knowledge learners gained from the course resulted from chats and discussions within their small groups and not from threaded discussions with the entire class. Results also indicate that learners with a high degree of social presence within their small groups developed a relationship that appeared to overshadow their relationship with classmates in other groups. Teaching presence may be affected by whether learners choose to collaborate in person or online and by where they choose to collaborate. The further the group moved away from the instructor's online or physical presence, the lower the degree of teaching presence the learners felt.

## Introduction

This study considers the educational interactions that contribute to cognitive, social, and teaching presence in an inquiry-based learning environment. It uses the Community of Inquiry model developed by Garrison, Anderson, and Archer (2000) to examine: (a) how learners experience cognitive presence through interactions that support knowledge construction, (b) the ability of learners to perceive and establish social presence in collaborative work, and (c) the attributes of teaching presence in a Web-enhanced course. This paper reports results of a mixed-methods study addressing the above factors that influence satisfaction with perceived knowledge gained in an inquiry-based learning environment.

The primary research question is: What types of interactions best assist learners in inquiry-based environments? The following secondary research questions were also addressed: (1) How is choice of collaborative format related to the perceived social and teaching presence of the learning environment? (2) Are there significant differences between the group of learners who chose an online collaborative format and the group who chose a face-to-face collaborative format in their satisfaction with perceived knowledge gained?

## The Learning Environment

The learners in this study were enrolled in a course about the philosophical and historical roots of adult education in American society. The course uses a dialogical, constructivist approach in which learners make meaning by formulating ideas and refining them through the responses of others. Therefore, collaborative work is central to the completion of the academic tasks. Because of the importance of learner-learner interaction to educational success in this course, learners had the opportunity to choose whether to conduct group work online using WebCT chat rooms or in person at a location of their choice.

There were three face-to-face sessions—at the beginning, middle, and end of the course. Throughout the quarter, learners worked in small groups (each with five members) to complete course requirements. This included contributing to small-group discussion sessions related to issues presented in the course readings; participating in weekly online threaded discussions

with other members of the class based on postings resulting from the small-group discussions; completing a midterm assessment; and writing a final paper.

### Conceptual Framework

This project is based in socioconstructivism, which recognizes social processes in individual knowledge building (Teasley & Roscelle, 1993; Lave, 1991). It explores those processes within a Community of Inquiry framework that assumes learning occurs through the interaction of cognitive presence, social presence, and teaching presence (Garrison, Anderson & Archer, 2000).

According to Garrison, Anderson, and Archer (2000), cognitive presence involves the ability of learners to construct meaning through sustained communication, social presence is the ability of learners to project their personal characteristics to their group members and classmates, and teaching presence involves course design, discourse facilitation, and direct instruction in text-based computer conferencing environments.

### Method and Procedures

The population consisted of 25 undergraduate and graduate learners enrolled in a winter quarter 2004 course at a large Midwestern university about philosophical and historical perspectives on adult education in American society. The mixed-methods study addressed the effectiveness of online and face-to-face collaborative work on satisfaction with perceived learning using a concurrent triangulation strategy with integration of data occurring during the analysis phase (Creswell, 2003). Primary data sources included focus group interviews with participants and a questionnaire that measured perceived social and teaching presence, interaction, and satisfaction with perceived knowledge gained from the course.

Focus group interviews following a semi-structured format were conducted with each of the five groups. Twenty-two volunteers participated. Face-to-face interviews were conducted with all 10 learners who chose to work collaboratively face to face. Online interviews were conducted with 12 learners who worked collaboratively online. The interview responses were analyzed in terms of cognitive, social, and teaching presence using the Community of Inquiry coding template (Garrison, Anderson, & Archer, 2000).

For the quantitative portion, the question of interest was the difference in satisfaction with perceived learning between the group of learners who chose an online collaborative format and those who chose a face-to-face format. A static group comparison design was used. The treatment variable was group format (online or face-to-face).

Independent variables assessed on a 19-item end-of-course questionnaire developed by the investigators were degree of perceived social presence (six items; alpha coefficient = .84), degree of perceived teaching presence (five items; alpha coefficient = .87), degree of perceived group interaction (four items; alpha coefficient = .97), and degree of perceived class interaction (four items; alpha coefficient = .84).

The dependent variable was satisfaction with perceived knowledge gained, which was also assessed on the end-of-course questionnaire (three items; alpha coefficient = .87). The questions asked respondents to rate (1) satisfaction with the learning gained from the discussion groups, (2) satisfaction with the knowledge gained from whole-class discussion

postings, and (3) satisfaction with the knowledge gained from the course. Answer categories ranged from 1, meaning very dissatisfied, to 5, meaning very satisfied.

### Findings

The following discussion describes educational interactions that illustrate how learners experienced cognitive, social, and teaching presence in an inquiry-based environment and the degree of satisfaction with their perceived knowledge gained.

#### Cognitive Presence

The first element in the Community of Inquiry model is cognitive presence, which involves the ability of learners to construct meaning through sustained communication (Garrison, Anderson, & Archer, 2000). Cognitive presence categories are triggering event, exploration, integration, and resolution; and indicators include having a sense of puzzlement, exchanging information, connecting ideas, and applying new ideas (Garrison, Anderson, & Archer, 2000). Table 1 shows the standard questions used in this study to ascertain cognitive presence.

Table 1. Standard Questions to Ascertain Cognitive Presence

Category	Questions
Triggering Event	What factors did you consider when deciding to work in small groups online or face to face?
Exploration	What types of interactions help you learn the material?
Integration	What is the process by which the moderator drafts the posting?
Resolution	How do you help one another work together on assignments?

Learners reported that their small-group discussions—whether online or face to face—helped most in understanding how adults historically learned in American society. “This approach to learning here has actually put us in the text, the way they would talk and learn,” said Letitia<sup>1</sup>, whose group met face to face. “We comment and hear each other’s answer and respect each other’s views and tie together the readings.”

Each week, moderators posted the results of their small-group discussions to the course bulletin board to engage others in the class in a broader discussion. Compared to the small-group discussions and readings, this seemed to be the least helpful educational interaction. Judy, a learner in a face-to-face group, said: “I tend to wonder, are they responding to my question, or are they speaking to be read by [the instructor] as intelligent. . . . Are they responding because they have to respond, or do they really care?” Greg, whose group met face to face, said, “For me, they’re more of a chore.” He noted that, unlike in chats or face-to-face discussions, the bulletin board postings “sound final” and participants engaged in little follow-up “because we just haven’t got time.”

#### Social Presence

The second element in the Community of Inquiry model is social presence, which involves the ability of learners to project their personal characteristics to their group members and classmates (Garrison, Anderson, & Archer, 2000). Social presence categories are emotional expression, open communication, and group cohesion; and indicators include emotions, risk-free expression, and encouraging collaboration (Garrison, Anderson, & Archer, 2000). Table 2 shows the standard questions used in this study to ascertain social presence.

Table 2. Standard Questions to Ascertain Social Presence

Category	Questions
Emotional Expression	How do you convey feeling and emotion online?
Open Communication	How do others convey a sense of their personality to you?
Group Cohesion	How have you gotten to know one another in your group? In the class? Any previous interactions? What rules evolved for you to follow when conducting your group sessions?

Learners in groups that met online reported that seeing everyone in their group the first day of class helped them begin to establish social presence, but that it solidified through the weekly chat sessions. Jane, whose online group members had no previous interactions, said, “Most of us . . . are very tolerant of each other and are ‘in it together’ . . . it creates almost an immediate [sic] sense of community after the first session.”<sup>2</sup>

Whether online or face to face, group relationships overshadowed relationships with other classmates. Ellen, whose group met in person, said, “Once it was established that we were really the core of our class, I really didn’t care about knowing the other people in the class.” That sentiment was echoed by Annette, an online learner who felt a “binding” among her group members that did not carry over to others in the class, who were merely “names on a screen.”

Despite the close relationship among online group members, learners in groups that met face to face reported being more satisfied with the level of dialogue, immediacy, and ability to convey their personalities and feelings than those in online groups. A t-test for independent samples showed a statistically significant difference in satisfaction with group interaction between the face-to-face groups and the online groups ( $t(21) = 3.9, p < .01$ ). The 10 face-to-face collaborators had an average satisfaction with group relationship score of 4.92 on a five-point scale ( $SD = .24$ ) compared with 3.94 ( $SD = .77$ ) for the 13 learners who collaborated online.

### Teaching Presence

The third element in the Community of Inquiry model is teaching presence, which encompasses course design and facilitation (Garrison, Anderson, & Archer, 2000). Teaching presence categories are instructional management, building understanding, and direct instruction; and indicators include defining and initiating discussion topics, sharing personal meaning, and focusing discussion (Garrison, Anderson, & Archer, 2000). Table 3 shows the standard questions used in this study to ascertain teaching presence.

Table 3. Standard Questions to Ascertain Teaching Presence

Category	Questions
Instructional Management	Is the instructor the same online as he is in class?
Building Understanding	Is your relationship with the instructor more connected face to face or less connected? What have you learned about yourself as a learner in this course?
Direct Instruction	What behavior do you expect an online instructor to model?

Expectations for the instructor's behavior seemed to differ between the online and face-to-face groups. Edward, a learner in an online group, expected the instructor to "provide appropriate, interesting, and challenging questions [sic] to stimulate online discussion." His colleague Jane said, "It was very helpful to have [the instructor] join our discussions now and then to see where we were, if we were on the right track and to offer new insights. The personal emails regarding our postings and responses were very helpful too. Made you feel like there was an instructor taking an active role in your learning and work."

The strong teaching presence for the group of online collaborators did not translate to the face-to-face groups. "We get very little in the way of interaction with the educator," said Ellen, whose group met off campus. Her group members missed "the experience of watching him. . . . his management of the group, how he fields questions . . . how he manages the clock, his body language," according to Lucy. "All those things for us—for all of us who are going to be educators in some capacity or who are already—we've missed out on that completely."

Quantitative results support the difference between the online and face-to-face groups. A t-test for independent samples showed a statistically significant difference in satisfaction with the level of personal, meaningful dialogue with the instructor between the face-to-face groups and the online groups ( $t(21) = -2.65$ ,  $p = .01$ ). The 10 face-to-face collaborators had an average satisfaction with instructor interaction score of 2.10 on a five-point scale ( $SD = .74$ ) compared with 3.38 ( $SD = 1.39$ ) for the 13 learners who collaborated online. Therefore, the online groups were significantly more satisfied with their interaction with the instructor than the face-to-face groups.

### Satisfaction with Perceived Knowledge Gained

The dependent variable, satisfaction with perceived knowledge gained, was assessed on the end-of-course questionnaire. A t-test for independent samples showed no difference in satisfaction with perceived knowledge gained between the group of learners who chose an online collaborative format and the group who chose a face-to-face collaborative format ( $t(21) = -.17$ ,  $p = .87$ ). The 13 learners who chose the online format had an average overall satisfaction with perceived knowledge gained score of 3.58 on a five-point scale ( $SD = .84$ ) compared with 3.53 ( $SD = .72$ ) for the 10 learners who chose the face-to-face format.

### Conclusions and Implications for Practice

This study examined how educational interactions facilitated cognitive, social, and teaching presence in inquiry-based learning and the degree of satisfaction learners reported with their perceived knowledge gained.

Garrison, Anderson, and Archer (2000) assert that social presence is important primarily as a support for cognitive presence. This research found that groups with a high degree of social presence developed a relationship that appeared to overshadow their relationship with the rest of the class. Social presence may support cognitive presence within the small group because of the ability of learners to engage in sustained communication through which they can construct meaning. However, a high degree of social presence within the group may restrict the ability to learn from the class discussion board where learners engaged in sporadic, perfunctory communication. This calls into question the value of activities involving the whole class in inquiry-based environments that feature small groups.

Regarding teaching presence, this research suggests that the further the group moved away from the instructor's online or physical presence, the lower the perception of teaching presence. The instructor in this course regularly joined chat sessions and visited a group that met in person on campus. A group that met off campus did not have that type of interaction and felt a lack of teaching presence. This suggests that instructors may want to compensate for their lack of physical presence in groups that meet off campus by increasing their online presence through e-mail or discussion postings that acknowledge the group's input. In addition, learners in this study who are future educators look beyond presentation of content to the teaching methods the instructor uses. Those who anticipate teaching face to face expect to learn from an instructor who will model face-to-face techniques.

The quantitative finding of no difference in satisfaction with perceived knowledge gained between learners who chose to collaborate online and those who chose to collaborate face to face has implications for course design wherein collaborative activities comprise a major portion of the course work. If learners are able to choose their collaborative format, it is expected that they would select what is most comfortable for them to bring about satisfactory results. This suggests it is worthwhile to offer different methods of collaborative learning that promote the ability for adults to interact with one another and the instructor in ways that foster their learning.

#### Notes

1. Pseudonyms were used to protect participants' privacy.
2. Online interviews have not been edited for spelling or grammar.

#### References

- Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches*, 2nd ed. Thousand Oaks, CA: Sage.
- Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, 2(2-3), 87-105.
- Lave, J. (1991). Situated learning in communities of practice. In L. B. Resnick, J. M. Levine, & S. D. Teasley (Eds.), *Perspectives on socially shared cognition* (pp. 63-82). Washington, DC: American Psychological Association.

Teasley, S., & Rochelle, J. (1993). Constructing a joint problem space: The computer as a tool for sharing knowledge. In S. P. Lajoie, & S. J. Derry (Eds), *Computers as cognitive tools* (pp. 229-257). Hillsdale, NJ: Lawrence Erlbaum.

---

David S. Stein, Ph.D., Associate Professor, The Ohio State University, Columbus,  
stein.1@osu.edu.

Constance E. Wanstreet, M.S., The Ohio State University, Columbus, wanstreet.2@osu.edu.

Presented at the Midwest Research-to-Practice Conference in Adult, Continuing, and  
Community Education, Indiana University, Indianapolis, IN, October 6-8, 2004.